EMR and Health

Report on electromagnetic radiation, health and well-being

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ACMA bill

ACMA is preparing legislation aimed at controlling communications and imposing penalties for information it does not approve

The 'Communications Legislation Amendment (Combatting Misinformation and Disinformation) Bill 2023' aims to control information available to the public by making online platform services responsible for the information they disseminate. It will apply to social media, search engines, instant messaging services, news aggregators and podcasting services. Hefty penalties will be imposed for noncompliance.

If passed, the Bill has the potential to censor all communications in Australia and strikes at the heart of freedom of speech.

The ACMA is accepting feedback from the public on the Bill until 20 August 2023.

Some of the many problems with the Bill include these.

- It violates Australian's democratic rights to freedom of speech.
- It blames the informer for the behaviour of the recipient by claiming that 'misinformation'/'disinformation' can cause people to do inappropriate things.

- It can be used to censor any information on any issue that any government does not approve now and in the future.
- It puts the development of a code of practice in the hands of the industry, leaving the general public out of the loop.
- No one government or agency has a monopoly on truth. Our perception of truth evolves over time with experience.
- It will silence dissenting experts.

Some of the questions that need to be asked about the Bill include these.

1.Who decides what constitutes 'misinformation'/ disinformation? (Their qualifications, experience, ties with industry)

2.To whom and what products will it apply? (unhealthy foods/cosmetics?)

3.How (by what process) will the government determine what constitutes 'misinformation'/'disinformation'?

4.How will it monitor the developments in that area to update its understanding of information/disinformation in the future?

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Schools ban wireless devices

Netherlands

The Dutch government recently announced plans to ban digital devices from classrooms from 1 January 2024 to improve learning.¹ The ban will apply to a range of wireless devices, including mobile phones, smart watches and tablets.

According to Education Minister Robbert Dijkgraaf, scientific research has shown that mobile phones disrupt concentration and, therefore, learning.

How the ban is implemented will be up to individual schools with parents, teachers and students involved in decision-making.

NSW schools

NSW schools are expected to implement bans on the use of mobile phones during classes, recess and breaks from term 4, 2023.

According to Prue Car, NSW Deputy Premier and Minister for Education and Early Learning, "A blanket ban in high schools will create a level playing field, reduce distractions in classrooms, help address cyberbullying issues and improve student learning outcomes. We know that parents across the state are concerned about the impact that devices like smartphones are having on their kids' learning and mental health.

Condell Park High School has successfully banned student mobile phones for 16 years with benefits to student learning and behaviour.'²

Mobile phones are already banned in high schools in South Australia, the Northern Territory, Victoria and Western Australia.

Digital devices and learning

Various studies have shown that the use of internet-connected devices has harmful effects on learning. Here are just a few.

- A 2018 study found that restricting children's screen time was associated with improved performance in cognition.³
- Scientists from Western Sydney University, Oxford University and the University of Manchester found that internet use caused changes in aspects of cognition, affecting memory and social activity.
- Using mobile phones during a break from work was shown to reduce performancesubsequently.
- A University of Chicago study found that even the presence of a smart phone reduced 'available cognitive capacity' and the greatest losers were those who were most dependent on smart phones. ⁶.
- 1. RTE, Netherlands to ban mobile phones from classrooms, 4 July 2023,
- 2. NSW Government, Media release;

Jeremy J Walsh et al, <u>Associations between 24 hour movement behaviours and global cognition in US children: a cross-sectional observational study</u>, The Lancet Child & Adolescent Health, Vol 2, Issue 11, P783-791, Nov 2018, DOI=
NICM Health Research Institute, Western Sydney University. (2019, June 5). <u>How the Internet may be changing the brain</u>. ScienceDaily. Retrieved March 13, 2022 from

5. Kang, S., & Kurtzberg, T. R. (2019). <u>Reach for your cell phone at your own risk:</u> <u>The cognitive costs of media choice for breaks</u>, Journal of Behavioral Addictions, 8 (3), 395-403.

6. Adrian F Ward, Brain Drain: The Mere Presence of One's Own Smartphone Reduces Available Cognitive Capacity, <u>Journal of the Association for Consumer</u> <u>ResearchVolume 2, Number 2</u>, 2017,



Calling all builders, developers, architects, planners and electricians!

Are you in the building industry or are you having a new home built or wired?

Let me tell you how we can help.

EMR Australia has just launched two EMF Awareness Training packages aimed at helping people in the building industry understand and factor in electromagnetic fields when designing, constructing and wiring a building.

These online programs provide business advantages to course participants by giving them:

- a unique opportunity to upskill to improve their knowledge and skills
- a marketing edge over competitors by enabling them to appeal to a growing market of informed and health-conscious consumers
- the potential for a free listing on EMR Australia's website.

And, of course, the programs benefits us and the rest of society by creating safer, healthier buildings.

For Electricians

Our *Electromagnetic Fields Awareness Training Program for Electricians* fills the gap between what electricians have been taught and what they need to know in the modern electrical environment.

It provides, information, tools, and resources to help electricians expand their services, wire buildings to reduce exposure and help reduce the risks associated with EMF exposure.

You can see more information about the course here.

For Builders, Developers, Architects and Planners

Our *Electromagnetic Fields Awareness Training Program for Builders, Developers, Architects and Planners* is an essential tool for people in the building industry.

It explains how electromagnetic fields impact a site, the business advantages of building to reduce exposure and provides design and shielding tips. You can see more information about the course contents <u>here</u>.

These programs provide insights that are essential to everyone living and working in the modern built environment.



New light on the body's electricity

Scientists have discovered something new and fascinating about human biology. And it has to do with biology's own electromagnetic fields.

We know that the body generates electrical energy – brain waves that can be measured with an EEG, fields from the heart that can be measured with an ECG, and electrical charges pass through cell membranes.

But a new study from Duke University has revealed that electrical fields also occur inside parts of some cells that remain relatively unstudied, in areas known as biological condensates, which play important roles in the body.

'Biomolecular condensates regulate diverse cellular processes, including stress response, signalling, and transcription,' says Dr Yifan Dai.

He says, 'Various types of biomolecular condensates can stably co-exist in a cell'. They exist side-by-side, separated not by membranes, but by a thin stratum that separates the condensates and the cytoplasm based on differences in their densities. Think of the structure of a mixture of oil and water. The meeting point between them is the 'interface' This is where the action takes place.

That's because there is a difference in the electrical potential between the denser interior of the condensate and the less dense cytoplasm in the cell. And this creates an electric field.

Dai's discovery shows that electrical fields exist within the cell, and not just at the cell membrane as previously thought.

Moreover, Dai has found that these biological condensates don't just regulate cellular functions through defined sets of biomolecules but also play an important role in driving redox reactions, a source of chemical energy.

When electric charges jump between one material and another, they can break molecules into fragments that can pair up and form hydroxyl radicals. These can then pair again to form hydrogen peroxide in tiny but detectable amounts.

These chemicals take place in what's known as redox reactions that play a role in the generation of energy in the body.

'Our study shows that such an interface can organize the formation of an electric double layer that generates an electric field, which can modulate redox reactions. These redox reactions can in turn affect intracellular redox balance and cell physiology,' Dai says.

Dai's study provides new insights on the body's intrinsic electric fields and their role in producing energy in the body.

'Magic can happen when substances get tiny and the ratio between the interfacial volume to its total volume becomes enormous,' Dai said. 'I think the implications are important to many different fields.'

Yifan Dai et al, Interface of biomolecular condensates modulates redox reactions, *Chem* (2023). DOI: 10.1016/j.chempr.2023.04.001

https://www.cell.com/chem/fulltext/S2451-9294(23) 00153-5?_returnURL=https%3A%2F% 2Flinkinghub.elsevier.com%2Fretrieve%2Fpii% 2FS2451929423001535%3Fshowall%3Dtrue



Electromagnetic fields and health

Electromagnetic fields affect health and it's necessary to reduce exposure, say EMF experts Professor Frank Barnes and Eugene Freeman Jr.

'... [B]iological systems can detect and respond to exposures to ME [electromagnetic] fields at power levels that are well below the current safety guidelines for cellular communications devices,' they wrote in a paper published late last year. 'Furthermore, data indicate that long-term exposures to low levels of RF [radiofrequency] power can lead to effects that are cumulative and generally not seen for short-term exposures.'

Some of these effects, they said, are therapeutic. Other are not.

In their paper, Barnes and Freeman referred to studies showing harmful effects such as:

- damage to male fertility from mobile phone radiation
- cancer in animals
- changes to reactive oxygen species
- and symptoms such as sleep loss, concentration problem, fatigue and memory loss.

'The recent research suggests that the effects of low-level EM fields on living organisms are non-trivial and potentially harmful. Given these revelations; regulators, providers, and users are under pressure to reach agreement on the most reasonable approach to minimize potentially harmful effects,' they said.

'Forcing a solution that eliminates all wireless communications is not a reasonable approach,' they wrote. 'Allowing the telecommunications industry and users to ignore the potential harm indicated by some of the experiments showing the effects of weak field exposures is equally unsatisfactory given the data that are currently available.'

Barnes and Freeman suggested a number of strategies that could be implemented, such as:

- designing transmitters to reduce power but that would affect performance and be costly, the said
- reducing the amount of radiation absorbed by a user's body, which can be 'accomplished by increasing the distance between the transmitting antenna and the user's body and head.
- redesigning transmitters to emit frequencies that are less biologically harmful
- limiting the length of a person's exposure by turning phones OFF after a certain interval
- 'minimizing the number of times a cell phone provides location and ranging data to the cell system when it not in use or moving'
- and education and information to change people's patterns of use.

"With such a large number of users, it is incumbent on system designers, operators, managers, and regulators to invest the time and energy to understand the risks of long-term exposure to low-level EM fields to determine potential hazard."

Barnes's is an authoritative voice in the field of electromagnetics. He was Vice President of IEEE [Institute of Electrical and Electronics engineers] for publication, Chairman of the Electron Device Society, President of the Bioelectromagnetics Society and U.S. Chair of Commission K-International Union of Radio Sciences.

Barnes Frank and Freeman Jr Eugene R, Some thoughts on the possible health effects of electric and magnetic fields and exposure guidelines, Frontiers in Public Health, Vol 10, 2022, https://www.frontiersin.org/articles/10.3389/ fpubh.2022.994758, DOI=10.3389/fpubh.2022.994758

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Latest buzz on bees

We know that humans are adversely affected by magnetic fields from powerlines and other electrical equipment, but what about bees?

Could the high magnetic fields from the powerlines that criss-cross their habitat affect bee health, behaviour and pollination activities?

It's a question to which researchers from Chile and Argentina have recently turned their attention.

The reason for their interest, they explained is this. '[H]oneybees are ... being increasingly exposed to artificial, lowfrequency EMF (such as those from overhead power lines), which acts as a stressor on honeybees, by altering the magnetic maps used during foraging flights and navigation and producing a magnetoreception disorder. This leads to fewer honeybees returning to the colony, disorientation, or even a total loss of adult foragers (colony collapse disorder).'

To study the effects of magnetic fields on the bees, the researchers focused on six high voltage towers, the equipment from which emitted levels of around 100 milliGauss (mG). (This is well below the 2000 mG limit allowed by international [ICNIRP] limits for human exposure but far above the 4mG level linked with increased risks of childhood leukemia and classified as a Class 2B carcinogen by the International Agency for Research on Cancer.)

The team chose to study the fields from electrical towers as opposed to power lines so that they could compare their findings with those from similar towers they could access.

They studied honeybees located close to and at a distance from the electrical towers. They found 'detrimental' effects of exposure, not just to honeybees, but to the surrounding plant community.

- There were fewer flowering poppies around active towers than those that were inactive.
- Bees working closer to active towers had higher levels of a protein called HsP70, indicating stress.
- Exposed bees had differences in 12 genes linked with navigation, stress and immunity.
- Bee visits to flowers near a tower were 308% less frequent than visits to areas away from towers.

'These negative effects of EMF could cascade into a number of additional effects on insects' physiology and behavior, including less pollen and honey harvested, impaired learning ability, flight dynamics, foraging, and feeding, as well as increased piping in the colony,' the authors wrote.

The team concluded that the fields from the electrical towers had a detrimental impact on honeybee pollination and, therefore, the surrounding plant community.

'We propose that honeybees' exposure to EMF disturbs their foraging capabilities by altering their magnetic navigation, learning, decision-making mechanisms, flight, and foraging, thus impairing pollination activity. This hypothesis would explain the observed reduction of workers' flower visitation around areas located in the proximity of active electric transmission towers, which we have established to be a prominent source of stress for honeybees,' they said.

Marco A. Molina-Montenegro et al, Electromagnetic fields disrupt the pollination service by honeybees, Science Advances (2023). <u>DOI: 10.1126/sciadv.adh1455</u>



Wireless radiation affects plants

It's known that wireless radiation has harmful effects on plants exposed in laboratories for short periods of time, but what happens when they're exposed in the natural environment for much longer?

To answer that question, researchers from Europe exposed ten species - 10 herbaceous grasses, forbs and legumes – over a four-month period, from seed germination to maturation. The frequencies they chose for this were 866 – 868 MHz because they were close to the frequencies used by both GMS (900 MHz) and LTD (800 MHz) technologies.

The plants were exposed to radiation levels that were 'a few hundred times lower' than radiation levels allowed in many countries around the world. 'This scenario resembled conditions in places of peak radiation around cellular base stations (on or near the axis of the main radiation beam from a cellular antenna),' the authors wrote.

The authors observed, 'RF-EMF [radiofrequency electromagnetic fields] effects in plants exposed to natural environmental stresses (not growing in optimum laboratory conditions) and these effects were permanent and irreversible. Furthermore, for some plant species the response to RF-EMF was clear, whereas for the others it was weak and difficult to detect, or showed no response at all.'

One species was more affected than the others - *Trifolium arvense*, often known as hare's-foot clover, which is a flowering plant in the bean family. In the first month, exposed plants grew higher, had larger leaves and changed leaf orientation.

However, after that they began to deteriorate more quickly than normal. 'This was manifested through the reduction of green leaf area, the concomitant increase of discolored leaf area, and smaller total leaf area developed over the growing season.' Some of them also died prematurely.

These results show that different species of plants appear to have different sensitivity to wireless radiation and that observing exposed plants for short periods of time may not reveal the full picture of how they respond.

'Our findings also suggest that *Trifolium arvense* can be considered a candidate for the indicator of ecological effects of man-made EMFs in the environment,' the authors said.

Previous short-term laboratory studies have shown that wireless radiation had harmful effects on plants. The authors pointed said, 'Numerous studies on plants have shown that wireless communication microwave radiation can affect their growth and development, gene expression and various metabolic activities. These effects occur at exposure levels equivalent or less than those often recorded under environmental conditions. Moreover, they were recorded for RF-EMFs differing in wavelength and polarization, continuous or modulated waves, and for different signal modulation types.'

Marek Czerwiński et al, 'Do electromagnetic fields used in telecommunications affect wild plant species? A control impact study conducted in the field,' Ecological Indicators, Volume 150, 2023, 110267, ISSN 1470-160X, https://doi.org/10.1016/

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'Numerous studies on plants have shown that wireless communication microwave radiation can affect their growth and development, gene expression and various metabolic activities'

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(Continued from page 1)

5.How will the government communicate to all Australians (of all ages, ethnicities, education levels and abilities) what they can and can't say in the future?

The ACMA is accepting comments on the bill:

- online: <u>https://infrastructure.gov.au/have-your say/acma-powers</u>
- by email: information.integrity@infrastructure.gov.au

You can see:

- EMR Australia's submission
- A submission by the Victorian Bar
- the draft legislation
- a fact sheet here.

How to be healthy

Would you like to feel great? Would you like better quality of life?

That's what good health is all about, says Greg Fitzgerald, a chiropractor, osteopath, naturopath and Dr of Allied Health.

In an interview with Lyn McLean, Greg explains how oxidative stress occurs when the body's capacity for creating damaging free radicals is greater than its capacity for repair. Oxidative stress underlies a wide range of health conditions – including diabetes, neurodegenerative diseases, heart disease, cancer – and the deterioration of the body associated with aging.

Greg shares important insights about health and what we can do to help counteract oxidative stress in our bodies & you can see the interview <u>here</u>.

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'Oxidative stress underlies a wide range of health conditions – including diabetes, neurodegenerative diseases, heart disease, cancer – and the deterioration of the body associated with aging'

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